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ASTRONOMICAL SOCIETY OF LONDON.

May 8, 1829. No. 20.

A PAPER was read from Mr. Rumker, containing observations made at Paramatta.

1. Twenty-one observations of the south polar distance of the sun about the northern solstice 1827.

2. Twenty observations of the south polar distance of the sun about the southern solstice 1827. These are reduced, and the resulting mean obliquity stated to be 23° 27′ 43″,16, Jan. 1, 1828.

3. Nineteen observations of the south polar distance of the sun about the autumnal equinox 1827.

The index error or south polar point of the mural circle with which these observations were made, was ascertained by numerous observations of stars above and below the pole near the times of solstice and equinox, and also by comparing the observed places of several standard stars with their apparent places in the *Nautical Almanac.*

All the observations of the sun and stars are given with the corrections and reductions, the index error as determined from each star and from a mean of all the stars, and a catalogue of the south polar distances of nineteen principal south circumpolar stars.

The observed semi-diameter of the sun appears to be too large from these observations, which agrees with what others have found it in the meridian.

The mean right ascension of β Crucis and α^2 Centauri, Jan. 1, 1828, deduced from a direct comparison with the sun at the foregoing autumnal equinox:—

	°	′	″
Mean R.A. β Crucis	129	26	1,074
——— α^2 Centauri	216	59	59,674

β Crucis has been preferred to α Crucis, because the latter is double, and very much resembles Castor in the magnitudes and distance of the component stars.

The method pursued by Mr. Rumker for obtaining the R.A. of β Crucis and α^2 Centauri is as follows:—Let δ be the observed declination of the sun, ω the obliquity of the ecliptic, and α the distance of the sun from the equinox given by the equation—$\sin \alpha = \cot \omega \times \sin \delta$; then, as ω may be considered as known with great exactness, the error in α will depend entirely upon the error in δ. Any other observed declination, δ', will also afford a corresponding value of the sun's R.A., or α'; and subtracting or

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its optical power, to observe the returns to the meridian of small stars near the pole by day-time. I have, nevertheless, deemed it expedient to insure the correctness of the right ascensions thus determined, by laying down, independently thereof, the position of fixed stars in different zones, so that other stars in the same parallel may be determined with a transit in a less perfect state."

4. Differences of the transits of the moon and moon-culminating stars, observed at Stargard and Paramatta between October 1825 and July 1826.

There was next communicated "A catalogue of upwards of 500 stars observed by Flamsteed, but not inserted in the British Catalogue; together with some remarks on Flamsteed's observations;" by F. Baily, Esq. This paper may, in some measure, be considered as a continuation of a former paper communicated by the author about two years ago, an abstract of which was given in No. 5 of these monthly notices. It is well known that we are indebted to Miss Caroline Herschel for this list of Flamsteed's inedited stars; who, by a laborious examination of every observation of every star, has discovered a great many that have never yet been reduced. Miss Herschel, however, has merely indicated the page and line of Flamsteed's observations, where the star is to be found, without any regard to the arrangement in right ascension, which did not enter into her plan; and it was, consequently, oftentimes very troublesome and inconvenient to ascertain even in what part of the heavens such stars were situated, when a reference was required to be made to them. Mr. Baily, therefore, has undertaken and completed the task of reducing all these observations to one common epoch, viz. the beginning of the year 1690, which is the epoch of Flamsteed's catalogue, whereby a convenient and easy reference may, at any time, be made to any star required. These places, however, it should be observed, are not given with any greater accuracy than the positions of the stars in Flamsteed's catalogue: since they are deduced merely by taking the differences in right ascension and declination between such stars, and certain known stars in their neighbourhood, observed on the same nights. A complete revision and reduction of Flamsteed's observations is still considered a desideratum by Mr. Baily; and which he hopes, at some future time, to see, if not wholly, at least in part, accomplished, by a reduction of some of the most important stars. When Miss Herschel published her list of these inedited stars, the catalogues of Bradley and Piazzi, and the voluminous observations of Lalande, had not been made public, and she was, consequently, unable to identify many of the stars in question: but, by a minute examination and comparison of these works, Mr. Baily has identified nearly all the stars which are given in Miss Herschel's list. Such as still remain undetermined are either those that have considerable north declination, and, consequently, situated in a part of the heavens which has not been much examined, or are such as have been but imperfectly observed by Flamsteed. In those cases where the star has been sufficiently identified, the synonyme is given by

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Mr. Baily in a collateral column; and at the end of the catalogue are inserted some *notes* relative to such other stars whose positions are somewhat doubtful.

[The publication of the Second Part of the Third Volume of the Society's Memoirs was announced.]

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